

**COMPARISON OF BIOTRANSFORMATION METHODS OF PADDY STRAW INTO  
BIOETHANOL**

**NURUL NADIA BINTI SARIF**

**Final Year Project Report Submitted in  
Partial Fulfilment of the Requirements for the  
Degree of Bachelor of Science (Hons.) Plantation Technology and Management  
In the Faculty of Plantation and Agrotechnology  
Universiti Teknologi MARA**


**JULY 2016**

## DECLARATION

This Final Year Project is a partial fulfilment of the requirement for a degree of Bachelor of Science (Hons.) Plantation Technology and Management, Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA.

It is entirely my own work and has not been submitted to any other University or higher education institution, or for any other academic award in this University. Where use has been made of the work of other people it has been fully acknowledged and fully referenced.

I hereby assign all and every right in the copyright to this work to the Universiti Teknologi MARA ('UiTM'), which henceforth shall be the owner of copyright in this Work and that, any reproduction or use in any form or by any means whatsoever is prohibited without a written consent of UiTM.

Candidate's signature: .....

Date: 25/7/2016

Name: NUPUL NADIA BINTI SAIP

I hereby declare that I have checked this project and in my opinion, this project is adequate in terms of scope and quality for the award of the degree of Bachelor of Science (Hons.) Plantation Technology and Management, Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA.

Signature: 

Name of Supervisor: .....  
**SITI SARAH JUMALI**  
PENSYARAH  
Fakulti Perlombongan dan Agroteknologi  
Universiti Teknologi MARA (Melaka)  
Kampus Jasin, 77300 Mertimau  
Melaka

Position: .....

Date: 25-7-2016

## **ACKNOWLEDGEMENTS**

In Alhamdulillah and very grateful to ALLAH S.W.T the might for giving me the opportunity to complete and submitted my final year project entitled “Comparison of Biotransformation Methods of Paddy Straw into Bioethanol”. I would also like to express my deepest appreciation to my supervisor Madam Siti Sarah Binti Jumali for her encouragement and guidance in the completion of the thesis.

Thanks also to the all lecturer and my seniors for their cooperation in giving ideas and lesson to me in order to complete of the thesis. For my entire friend and my family, thanks giving support and help to me in order to complete this study in time.

---

I hope this paper will give benefit to all student of plantation management in order to found new method for bioethanol.

Thank you.

NURUL NADIA BINTI SARIF

## TABLE OF CONTENTS

	PAGE
<b>DECLARATION</b>	ii
<b>ACKNOWLEDGEMENTS</b>	iii
<b>TABLE OF CONTENTS</b>	iv
<b>LIST OF FIGURES</b>	v
<b>LIST OF TABLES</b>	vi
<b>LIST OF ABBREVIATIONS</b>	vii
<b>ABSTRACT</b>	viii
<b>ABSTRAK</b>	xi
<b>1.0 INTRODUCTION</b>	1
<b>1.1 OBJECTIVES</b>	3
<b>1.2 SIGNIFICANCE OF STUDY</b>	3
<b>2.0 POTENTIAL OF PADDY STRAW</b>	4
<b>IN FUEL ETHANOL PRODUCTION</b>	
<b>3.0 AVAILABILITY OF PADDY STRAW</b>	8
<b>4.0 GENERATION OF ETHANOL DERIVED</b>	11
<b>FROM PADDY STALK</b>	
4.1 Basic concept	11
4.2 Importance of pretreatment	12
4.3 Comparison of pretreatment method	12
4.3.1 Physical pretreatment	12
4.3.1.1 Electron beam irradiation	13
4.3.2 Chemical pretreatment method	13
4.3.2.1 Alkaline pretreatment	13
4.3.3 Biological pretreatment	16
4.4 Enzymatic hydrolysis	18
4.5 Comparison of fermentation process between	19
simultaneous saccharification and fermentation (SSF)	
and separate enzymatic hydrolysis and	
fermentation (SHF).	
<b>5.0 CURRENT PROSPECT</b>	21
<b>6.0 CONCLUSION</b>	22
<b>CITED REFERENCE</b>	23
<b>CURRICULUM VITAE</b>	

## ABSTRACT

### COMPARISON OF BIOTRANSFORMATION METHODS OF PADDY STRAW INTO BIOETHANOL

Biofuel production can be categorized into biodiesel and bioethanol. Bioethanol is one alternative for transport fuel substitution. The most common renewable fuel today is ethanol derived from sugar. Besides that, future large-scale use for ethanol will most certainly have to be based on production from lignocellulosic materials. This review gives an overview of the new technologies of biotransformation on paddy straw into bioethanol. Rice straw has lignocellulosic material for bioethanol production since it is one of the most abundant renewable resources. The paddy straw has special characteristics such as high hemicellulose and cellulose content that can be readily hydrolyzed into fermentable sugars. One of the major challenges in developing technology for bioethanol production from paddy straw is selection of an appropriate pretreatment and fermentation method.

**Keywords:** *Pretreatment method, Future perspective, Bioethanol*

---